AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions, and listings, of claims in the application:

1. (Currently Amended) An article of manufacture, comprising:

a non-transitory program storage device having stored thereon program instructions executable by a processing device to perform operations for estimating motion ~~trials~~ in ~~video~~ an image ~~sequences~~sequence, the operations comprising:

providing data points representing information from [[an]]the image sequence; and

performing regression clustering using a K-Harmonic Means function to cluster the data points and to provide motion information regarding the data points;

wherein the performing regression clustering includes:

selecting a number, K, of regression clusters for the data points from [[an]]the image sequence;

initializing regression functions for each of the K clusters to estimate ~~centers of~~ motion paths in the image sequence~~for the data points~~;

calculating ~~distances from each~~ values representing errors between the data ~~point to each~~ points and corresponding ones of the K regression functions;

calculating a membership probability for each data point based on ~~distances between the K regression functions and each data point~~the values representing errors;

applying regression to recalculate the K regression functions based at least on the membership probabilities;

determining whether changes in membership probabilities or changes in the K regression functions satisfy a stopping criterion;

repeating calculating the ~~distances~~values representing errors, calculating the membership probability, applying regression, and determining whether changes satisfy the stopping criterion if the changes in membership probabilities or changes in the K regression functions do not satisfy the stopping criterion; and

using motion paths represented by the recalculated K regression functions if the changes in membership probabilities or changes in the K regression functions satisfy the stopping criterion.

2. (Currently Amended) The ~~program storage device~~ article of claim 1, wherein the performing the regression clustering using the K-Harmonic Means function to cluster the data points and to provide motion information regarding the data points further comprises providing motion vectors for the data points.

3. (Currently Amended) The ~~program storage device~~ article of claim 1, wherein the performing the regression clustering using the K-Harmonic Means function to cluster the data points and to provide motion information regarding the data points further comprises providing at least one motion path for the data points.

4. (Cancelled)

5. (Currently Amended) The ~~program storage device~~ article of claim 1, wherein the initializing the regression functions for each of the K clusters further comprises randomly initializing regression functions for each of the K clusters.

6. (Cancelled)

7. (Currently Amended) The ~~program storage device~~ article of claim 1, wherein the program instructions are executable to further calculate a weighting factor for each data point based on ~~distances~~ the values representing errors between the K regression functions and ~~each~~ the data ~~point~~points, wherein the weighting factor is chosen to allow the K regression functions to be optimized with less sensitivity to initialization of the K regression functions.

8. (Currently Amended) The ~~program storage device~~ article of claim 1 further comprising extracting data according to a predetermined criteria to provide the data points.

9. (Currently Amended) The ~~program storage device~~ article of claim 8, wherein the extracting data according to the predetermined criteria comprises portioning data according to color.

10. (Currently Amended) The ~~program storage device~~ article of claim 1, wherein the program instructions further include instructions for performing the operations comprising preparing each of the data points as x-y-coordinate data points.

11. (Currently Amended) The ~~program storage device~~ article of claim 1, wherein the program instructions further include instructions for performing the operations comprising using the recalculated K regression functions to render the image sequence with motion paths shown on a display.

12. (Currently Amended) The ~~program storage device~~ article of claim 11, wherein the using the recalculated K regression functions to render the image sequence further comprises overlaying the recalculated K regression functions on ~~the video~~ images of the image sequence to show motion between the ~~video~~ images.

13. (Currently Amended) A system for estimating motion trials in video image sequences, comprising:

at least one processor;

an image sequence retrieval module for retrieving a current image and a first reference image and providing data points representing information from the current image and the first reference image; and

a motion estimator, coupled to the image sequence retrieval module, for performing regression clustering using a K-Harmonic Means function to cluster the data points and to provide motion information regarding the data points;

wherein the motion estimator ~~performs~~ is configured to perform regression clustering by selecting a number, K, of regression clusters for data points from an image sequence including the current image and the first reference image, ~~initializing~~ initialize regression functions for each of the K clusters to estimate ~~centers of motion for the data points, calculating distances from each~~ motion paths in the image sequence, calculate values representing errors between the data ~~point to each~~ points and corresponding ones of the K regression functions, ~~calculating~~ calculate a membership probability for each data point based on ~~distances between the K regression functions and each data point, applying~~ the values representing errors, apply regression to recalculate the K regression functions based at least on the membership probabilities, ~~determining~~determine whether changes in membership probabilities or changes in the K regression functions satisfy a stopping criterion, ~~repeating~~repeat calculating the ~~distances~~values representing errors, calculating the membership probability, applying regression, and determining whether changes satisfy the stopping criterion if the changes in membership probabilities or changes in the K regression functions do not satisfy the stopping criterion, and ~~using~~use motion paths represented by the recalculated K regression functions if the changes in membership probabilities or changes in the K regression functions satisfy the stopping criterion,

wherein the image sequence retrieval module and motion estimator are executable on the at least one processor.

14. (Currently Amended) The system of claim 13, wherein the motion information regarding the data points ~~further~~ comprises motion vectors for the data points.

15. (Currently Amended) The system of claim 13, wherein the motion information regarding the data points ~~further~~ comprises at least one motion path for the data points.

16. (Cancelled)

17. (Previously Presented) The system of claim 13, wherein the motion estimator is to randomly initialize regression functions for each of the K clusters.

18. (Cancelled)

19. (Currently Amended) The system of claim 13, wherein the motion estimator is to further calculate a weighting factor for each data point based on ~~distances between~~ the values representing errors between the K regression functions and ~~each~~ the data ~~point~~points, wherein the weighting factor is chosen to allow the K regression functions to be optimized with less sensitivity to initialization of the K regression functions.

20. (Previously Presented) The system of claim 13, wherein the motion estimator is to extract data according to predetermined criteria.

21. (Previously Presented) The system of claim 20, wherein the motion estimator is to extract data according to color.

22. (Previously Presented) The system of claim 13, wherein the image sequence retrieval module is to prepare each of the data points as x-y-coordinate data points.

23. (Currently Amended) The system of claim 13, wherein the at least one processor is configured to use ~~further comprising a processor for using~~ the recalculated K regression functions to render the image sequence with motion paths shown on a display.

24. (Currently Amended) The system of claim 23, wherein the at least one processor ~~overlays~~ is configured to overlay the K regression functions on the ~~video~~ images of the image sequence to show motion between the current image and the first reference image.

25. (Currently Amended) A method for estimating motion ~~trials in video~~ an image ~~sequencessequence~~, the method comprising:

providing data points representing information from [[an]]the image sequence; and

performing, by [[a]]at least one processor, regression clustering using a K-Harmonic Means function to cluster the data points and to provide motion information regarding the data points,

wherein the performing regression clustering comprises:

selecting a number, K, of regression clusters for the data points from [[an]]the image sequence;

initializing regression functions for each of the K clusters to estimate ~~centers of~~ motion paths in the image sequence~~for the data points~~;

calculating ~~distances from each~~ values representing errors between the data ~~point to each~~ points and corresponding ones of the K regression functions;

calculating a membership probability for each data point based on ~~distances between the K regression functions and each data point~~the values representing errors;

applying regression to recalculate the K regression functions based at least on the membership probabilities;

determining whether changes in membership probabilities or changes in the K regression functions satisfy a stopping criterion;

repeating calculating the ~~distances~~values representing errors, calculating the membership probability, applying regression, and determining whether changes satisfy the stopping criterion if the changes in membership probabilities or changes in the K regression functions do not satisfy the stopping criterion; and

using motion paths represented by the recalculated K regression functions if the changes in membership probabilities or changes in the K regression functions satisfy the stopping criterion.

26.-29. (Cancelled)